

117TH CONGRESS  
1ST SESSION

# S. 939

To encourage the research and use of innovative materials and associated techniques in the construction and preservation of the domestic transportation and water infrastructure system, and for other purposes.

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IN THE SENATE OF THE UNITED STATES

MARCH 24, 2021

Mr. WHITEHOUSE (for himself and Ms. COLLINS) introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

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## A BILL

To encourage the research and use of innovative materials and associated techniques in the construction and preservation of the domestic transportation and water infrastructure system, and for other purposes.

1       *Be it enacted by the Senate and House of Representa-  
2 tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4       This Act may be cited as the “Innovative Materials  
5 for America’s Growth and Infrastructure Newly Expanded  
6 Act of 2021” or the “IMAGINE Act”.

7 **SEC. 2. PURPOSES.**

8       The purposes of this Act are—

- 1                             (1) to encourage the research and use of innovative materials, in concert with traditional materials, and associated techniques in the construction and preservation of the domestic infrastructure network;
- 6                             (2) to accelerate the deployment and extend the service life, improve the performance, and reduce the cost of infrastructure projects; and
- 9                             (3) to improve the economy, resilience, maintainability, sustainability, and safety of the domestic infrastructure network.

12 **SEC. 3. INTERAGENCY INNOVATIVE MATERIALS STANDARDS TASK FORCE.**

14                         (a) **DEFINITION OF INNOVATIVE MATERIAL.**—In this section, the term “innovative material”, with respect to an infrastructure project, includes a material, or a combination or process for use of materials, that, as determined by the appropriate Secretary or agency head—

19                             (1) enhances the overall service life, sustainability, and resiliency of the project; or

21                             (2) provides ancillary benefits relative to widely adopted state of practice technologies.

23                         (b) **PURPOSES.**—The purposes of this section are—

24                             (1) to encourage the research, design, and use of innovative materials, in concert with traditional

1 materials, and associated techniques in the construc-  
2 tion and preservation of the domestic infrastructure  
3 network;

4 (2) to accelerate the deployment, extend the  
5 service life, improve the performance, and reduce the  
6 cost of infrastructure projects; and

7 (3) to improve the economy, resilience, main-  
8 tainability, sustainability, and safety of the domestic  
9 infrastructure network.

10 (c) ESTABLISHMENT.—

11 (1) IN GENERAL.—Not later than 180 days  
12 after the date of enactment of this Act, the Director  
13 of the National Institute of Standards and Tech-  
14 nology shall establish an Interagency Innovative Ma-  
15 terials Standards Task Force (referred to in this  
16 section as the “Task Force”) composed of the heads  
17 of Federal agencies responsible for significant civil  
18 infrastructure projects, including the Administrator  
19 of the Federal Highway Administration.

20 (2) CHAIRPERSON.—The Director of the Na-  
21 tional Institute of Standards and Technology shall  
22 serve as Chairperson of the Task Force.

23 (d) DUTIES.—The Task Force shall coordinate and  
24 improve, with respect to infrastructure construction, retro-  
25 fitting, rehabilitation, and other improvements—

1                             (1) Federal testing standards;  
2                             (2) Federal design and use guidelines;  
3                             (3) Federal regulations; and  
4                             (4) other applicable standards and performance  
5                             and sustainability metrics.

6                             (e) REPORT.—

7                             (1) IN GENERAL.—Not later than 18 months  
8                             after the date of enactment of this Act, the Task  
9                             Force shall conduct, and submit to the appropriate  
10                            committees of Congress a report that describes the  
11                            results of, a study—

12                             (A) to assess the standards and perform-  
13                             ance metrics for the use of innovative materials  
14                             in infrastructure projects;

15                             (B) to identify any barriers, regulatory or  
16                             otherwise, relating to the standards described in  
17                             subparagraph (A) that preclude the use of cer-  
18                             tain products or associated techniques; and

19                             (C) to identify opportunities for the devel-  
20                             opment of standardized designs and materials  
21                             genome approaches that design and use innova-  
22                             tive materials to reduce costs, improve perform-  
23                             ance and sustainability, and extend the service  
24                             life of infrastructure assets.

11           (f) IMPROVED COORDINATION.—Not later than 2  
12 years after the date of enactment of this Act, the Task  
13 Force shall collaborate with any non-Federal entity identi-  
14 fied under subsection (e)(2)(A)—

15 (1) to identify and carry out appropriate re-  
16 search, testing methods, and processes relating to  
17 the development and use of innovative materials;

1                             (4) to develop a plan for addressing potential  
2                             barriers, regulatory or otherwise, identified in sub-  
3                             section (e)(1)(B); and

4                             (5) to develop a plan for the development of  
5                             standardized designs that use innovative materials to  
6                             reduce costs, improve performance and sustain-  
7                             ability, and extend the service life of infrastructure  
8                             assets.

9 **SEC. 4. INNOVATIVE MATERIAL INNOVATION HUBS.**

10                         (a) DEFINITIONS.—In this section:

11                         (1) HUB.—The term “Hub” means an Innovative  
12                         Material Innovation Hub established under this  
13                         section.

14                         (2) INNOVATIVE MATERIAL.—The term “innova-  
15                         tive material”, with respect to an infrastructure  
16                         project, includes a material, or a combination or  
17                         process for use of materials, that, as determined by  
18                         the Secretary—

19                         (A) enhances the overall service life, sus-  
20                         tainability, and resiliency of the project; or

21                         (B) provides ancillary benefits relative to  
22                         widely adopted state of practice technologies.

23                         (3) QUALIFYING ENTITY.—The term “quali-  
24                         fying entity” means—

(A) an institution of higher education (as defined in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)));

(B) an appropriate Federal or State entity, including a federally-funded research and development center of the Department of Transportation;

(C) a university transportation center under section 5505 of title 49, United States Code; and

(D) a research and development entity in existence on the date of enactment of this Act focused on innovative materials that the Secretary determines to be similar in scope and intent to a Hub.

**18 (b) ESTABLISHMENT.—**

1 development, and commercial application of innovative  
2 materials.

3 (2) COORDINATION.—The Secretary shall en-  
4 sure the coordination of, and avoid duplication of,  
5 the activities of each Hub with the activities of—

6 (A) other research entities of the Depart-  
7 ment of Transportation, including the Federal  
8 Highway Administration; and

9 (B) research entities of other Federal  
10 agencies, as appropriate.

11 (c) COMPETITIVE SELECTION PROCESS.—

12 (1) ELIGIBILITY.—To be eligible to receive an  
13 award for the establishment and operation of a Hub  
14 under subsection (b)(1), a consortium shall—

15 (A) be composed of not fewer than 2 qual-  
16 fying entities;

17 (B) operate subject to a binding agree-  
18 ment, entered into by each member of the con-  
19 sortium, that documents—

20 (i) the proposed partnership agree-  
21 ment, including the governance and man-  
22 agement structure of the Hub;

23 (ii) measures the consortium will un-  
24 dertake to enable cost-effective implemen-

1 tation of activities under the program de-  
2 scribed in subsection (b)(1); and

3 (iii) a proposed budget, including fi-  
4 nancial contributions from non-Federal  
5 sources; and

6 (C) operate as a nonprofit organization.

7 (2) APPLICATION.—

8 (A) IN GENERAL.—A consortium seeking  
9 to establish and operate a Hub under sub-  
10 section (b)(1) shall submit to the Secretary an  
11 application at such time, in such manner, and  
12 containing such information as the Secretary  
13 may require, including a detailed description  
14 of—

15 (i) each element of the consortium  
16 agreement required under paragraph  
17 (1)(B); and

18 (ii) any existing facilities the consor-  
19 tium intends to use for Hub activities.

20 (B) REQUIREMENT.—If the consortium  
21 members will not be located at 1 centralized lo-  
22 cation, the application under subparagraph (A)  
23 shall include a communications plan that en-  
24 sures close coordination and integration of Hub  
25 activities.

## 1 (3) SELECTION.—

2                             (A) IN GENERAL.—The Secretary shall se-  
3 lect consortia for awards for the establishment  
4 and operation of Hubs through a competitive  
5 selection process.

6                             (B) CONSIDERATIONS.—In selecting con-  
7 sortia under subparagraph (A), the Secretary  
8 shall consider—

9                                 (i) any existing facilities a consortium  
10 has identified to be used for Hub activities;  
11                                 (ii) maintaining geographic diversity  
12 in locations of selected Hubs;

13                                 (iii) the demonstrated ability of the  
14 recipient to conduct and support multi-  
15 disciplinary, collaborative research, devel-  
16 opment, demonstration, standardized de-  
17 sign development, and commercial applica-  
18 tion of innovative materials;

19                                 (iv) the demonstrated research, tech-  
20 nology transfer, and education resources  
21 available to the recipient to carry out this  
22 section;

23                                 (v) the ability of the recipient to pro-  
24 vide leadership in solving immediate and  
25 long-range national and regional transpor-

1 tation problems related to innovative mate-  
2 rials;

3 (vi) the demonstrated ability of the re-  
4 cipient to disseminate results and spur the  
5 implementation of transportation research  
6 and education programs through national  
7 or statewide continuing education pro-  
8 grams;

9 (vii) the demonstrated commitment of  
10 the recipient to the use of peer review prin-  
11 ciples and other research best practices in  
12 the selection, management, and dissemina-  
13 tion of research projects;

14 (viii) the performance metrics to be  
15 used in assessing the performance of the  
16 recipient in meeting the stated research,  
17 technology transfer, education, and out-  
18 reach goals; and

19 (ix) the ability of the recipient to im-  
20 plement the proposed program in a cost-ef-  
21 ficient manner, including through cost  
22 sharing and overall reduced overhead, fa-  
23 cilities, and administrative costs.

24 (4) TRANSPARENCY.—

1                             (A) IN GENERAL.—The Secretary shall  
2                             provide to each applicant, on request, any mate-  
3                             rials, including copies of reviews (with any in-  
4                             formation that would identify a reviewer re-  
5                             dacted), used in the evaluation process of the  
6                             proposal of the applicant.

7                             (B) REPORTS.—The Secretary shall sub-  
8                             mit to the Committee on Transportation and  
9                             Infrastructure of the House of Representatives  
10                            and the Committee on Environment and Public  
11                            Works of the Senate a report that describes the  
12                            overall review process under paragraph (2),  
13                            given the considerations under paragraph  
14                            (3)(B), that includes—

15                                 (i) specific criteria of evaluation used  
16                             in the review;  
17                                 (ii) descriptions of the review process;  
18                             and  
19                                 (iii) explanations of the selected  
20                             awards.

21                             (d) AUTHORIZATION OF APPROPRIATIONS.—

22                             (1) IN GENERAL.—There are authorized to be  
23                             appropriated to carry out this section such sums as  
24                             are necessary.

1                         (2) AVAILABILITY.—Amounts made available to  
2 carry out this section shall remain available for a pe-  
3 riod of 3 years after the last day of the fiscal year  
4 in which the amounts were made available.

5                         (e) HUB OPERATIONS.—

6                         (1) IN GENERAL.—Each Hub shall conduct, or  
7 provide for, multidisciplinary, collaborative research,  
8 development, demonstration, and commercial appli-  
9 cation of innovative materials.

10                        (2) ACTIVITIES.—Each Hub shall—

11                        (A) encourage collaboration and commu-  
12 nication among the member qualifying entities  
13 of the consortium, as described in subsection  
14 (c)(1), and awardees;

15                        (B) develop and publish proposed plans  
16 and programs on a publicly accessible website;

17                        (C) submit to the Department of Trans-  
18 portation an annual report summarizing the ac-  
19 tivities of the Hub, including information—

20                        (i) detailing organizational expendi-  
21 tures; and

22                        (ii) describing each project under-  
23 taken by the Hub, as it relates to con-  
24 ducting and supporting multidisciplinary,  
25 collaborative research, development, dem-

1           onstration, standardized design develop-  
2           ment, and commercial application of inno-  
3           vative materials; and  
4           (D) monitor project implementation and  
5           coordination.

6           (3) CONFLICTS OF INTEREST.—Each Hub shall  
7           maintain conflict of interest procedures, consistent  
8           with the conflict of interest procedures of the De-  
9           partment of Transportation.

10          (4) PROHIBITION ON CONSTRUCTION AND REN-  
11          OVATION.—

12          (A) IN GENERAL.—No funds provided  
13           under this section may be used for construction  
14           or renovation of new buildings, test beds, or ad-  
15           ditional facilities for Hubs.

16          (B) NON-FEDERAL SHARE.—Construction  
17           of new buildings or facilities shall not be consid-  
18           ered as part of the non-Federal share of a Hub  
19           cost-sharing agreement.

20          (f) APPLICABILITY.—The Secretary shall administer  
21           this section in accordance with section 330 of title 49,  
22           United States Code.

23 **SEC. 5. TURNER-FAIRBANK HIGHWAY RESEARCH CENTER.**

24          Section 503(b)(7) of title 23, United States Code, is  
25          amended by adding at the end the following:

## 1           “(C) INNOVATIVE MATERIALS.—

2           “(i) DEFINITION OF INNOVATIVE MA-  
3           TERIAL.—In this subparagraph, the term  
4           ‘innovative material’, with respect to an in-  
5           frastructure project, includes high perform-  
6           ance asphalt mixtures and concrete formu-  
7           lations, geosynthetic materials, advanced  
8           insulating materials, advanced alloys and  
9           metals, reinforced polymer composites, ad-  
10           vanced polymers, nanocellulose and wood-  
11           based composites, coatings, highly func-  
12           tional adhesives, or other corrosion preven-  
13           tion methods used in conjunction with  
14           those materials, and any other material or  
15           aggregate materials, as determined by the  
16           appropriate agency or department head.

17           “(ii) COLLABORATION WITH STATES  
18           AND TRIBES.—The Secretary shall expand  
19           the capacity of the Turner-Fairbank High-  
20           way Research Center to collaborate with  
21           relevant State and Tribal agencies—

22           “(I) with respect to the use of in-  
23           novative materials in construction  
24           projects carried out by the State and  
25           Tribal agencies; and

1                         “(II) to understand and iden-  
2                         tify—

3                         “(aa) the needs of the State  
4                         and Tribal agencies; and

5                         “(bb) innovative materials  
6                         that may be further researched,  
7                         developed, and used to meet  
8                         those needs.

9                         “(iii) ACTIVITIES.—The collaboration  
10                         described in clause (ii) may include—

11                         “(I) the development of new  
12                         training for State and Tribal agencies;  
13                         and

14                         “(II) the expansion of technical  
15                         training that involves State or Tribal  
16                         departments of transportation in the  
17                         development of new construction de-  
18                         signs for innovative materials at the  
19                         Turner-Fairbank Highway Research  
20                         Center.

21                         “(iv) PRIORITY RESEARCH.—The Tur-  
22                         ner-Fairbank Highway Research Center  
23                         shall prioritize research relating to—

24                         “(I) the use of innovative mate-  
25                         rials in—

1                         “(aa) bridges with a span  
2                         equal to or greater than 50 feet;  
3                         “(bb) highway reconstruc-  
4                         tion and rehabilitation; and  
5                         “(cc) rural road infrastruc-  
6                         ture;  
7                         “(II) the development of stand-  
8                         ardized designs using innovative mate-  
9                         rials; and  
10                        “(III) coastal resiliency.

11                        “(v) AUTHORIZATION OF APPROPRIA-  
12                        TIONS.—There is authorized to be appro-  
13                        priated to carry out this subparagraph  
14                        \$8,000,000 for each of fiscal years 2022  
15                        through 2026.”.

**16 SEC. 6. INNOVATIVE BRIDGE PROGRAM.**

17                        (a) DEFINITION OF ADMINISTRATOR.—In this sec-  
18                        tion, the term “Administrator” means the Administrator  
19                        of the Federal Highway Administration.

20                        (b) ESTABLISHMENT.—The Administrator shall es-  
21                        tablish a grant program, to be known as the “Innovative  
22                        Bridge Program”, to provide grants to State departments  
23                        of transportation, Tribal governments, public toll authori-  
24                        ties, and units of local government for—

1                   (1) coastal or rural infrastructure bridge  
2 projects; and

3                   (2) value engineering projects under subsection  
4 (g).

5                   (c) APPLICATIONS.—To be eligible to receive a grant  
6 under subsection (b), a State department of transpor-  
7 tation, a unit of Tribal government, a public toll authority,  
8 or a unit of local government shall submit to the Adminis-  
9 trator an application at such time, in such manner, and  
10 containing such information as the Administrator may re-  
11 quire.

12                  (d) ELIGIBLE PROJECTS.—To be eligible to receive  
13 a grant under this section, a coastal or rural infrastruc-  
14 ture bridge project or a value engineering project shall—

15                  (1) be for the purpose of construction, preserva-  
16 tion, rehabilitation, or reconstruction of a bridge  
17 with a span equal to or greater than 50 feet;

18                  (2) be carried out in a manner so as to reduce  
19 traffic impact;

20                  (3) include multimodal transportation compo-  
21 nents, such as bicycle and pedestrian paths; and

22                  (4) use innovative materials that—

23                      (A) are resistant to corrosion; and

24                      (B) extend the service life of the bridge.

1       (e) PREFERENCES.—In providing grants under this  
2 section, the Administrator shall give preference to pro-  
3 posed projects that—

- 4                 (1) use materials that are domestically pro-  
5 duced and sourced;  
6                 (2) use nontraditional production techniques,  
7 such as factory prefabrication;  
8                 (3) include multimodal transportation compo-  
9 nents, such as bicycle and pedestrian paths; and  
10                 (4) retrofit a bridge.

11       (f) SPECIAL CONSIDERATION FOR AT-RISK AREAS.—  
12 In providing grants under this section, the Administrator  
13 shall give special consideration to projects located in rural  
14 areas or areas prone to coastal or inland flooding due to  
15 severe storms (such as hurricanes or rain bursts), storm  
16 surges, or projected sea level rise during the projected life-  
17 time of the project.

18       (g) VALUE ENGINEERING USING INNOVATIVE MATE-  
19 RIALS.—Of the amounts made available to carry out this  
20 section, the Administrator shall set aside \$10,000,000 for  
21 each of fiscal years 2022 through 2026 to provide funding  
22 to 1 or more State departments of transportation or units  
23 of Tribal or local government that submit to the Adminis-  
24 trator an application to carry out value engineering of a  
25 standard bridge design to enhance the performance of the

1 bridge (including extending the service life of the bridge,  
2 increasing resistance to corrosion, and reducing construc-  
3 tion and preservation costs) through the use of innovative  
4 materials.

5 (h) RECORDKEEPING; REPORTS.—

6 (1) RECORDKEEPING.—Not later than 1 year  
7 after the date of enactment of this Act, the Adminis-  
8 trator shall develop a project recordkeeping system  
9 that maintains comprehensive, current, and accurate  
10 information on each grant provided under this sec-  
11 tion.

12 (2) REPORTS.—Not later than 2 years after the  
13 development of the recordkeeping system described  
14 in paragraph (1), and every 2 years thereafter, the  
15 Administrator shall submit to the Committee on  
16 Transportation and Infrastructure of the House of  
17 Representatives and the Committee on Environment  
18 and Public Works of the Senate, and make publicly  
19 available, a report that describes, with respect to  
20 each project that receives a grant under this sec-  
21 tion—

- 22 (A) the status of the project;  
23 (B) the location of the project;  
24 (C) for each bridge involved in the project,  
25 the inventory number of the bridge in the Na-

1           tional Bridge Inventory pursuant to section 144  
2           of title 23, United States Code;

3               (D) a detailed description of the scope of  
4           the project;

5               (E) the amount of project costs paid by  
6           funds provided under this section and the total  
7           project costs;

8               (F) for each bridge involved in the project,  
9           the bridge condition, operations, and perform-  
10          ance of the bridge; and

11               (G) in every third report submitted under  
12          this paragraph, the results of the regular moni-  
13          toring and evaluation of the maintenance de-  
14          mands, projects, needs, and costs of each bridge  
15          in the project during the previous 6 years.

16               (i) AUTHORIZATION OF APPROPRIATIONS.—There is  
17          authorized to be appropriated to the Administrator to  
18          carry out this section \$65,000,000 for each of fiscal years  
19          2022 through 2026.

20 **SEC. 7. WATER INFRASTRUCTURE INNOVATION PROGRAM.**

21               (a) ESTABLISHMENT.—The Administrator of the En-  
22          vironmental Protection Agency (referred to in this section  
23          as the “Administrator”) shall establish a grant program,  
24          to be known as the “Water Infrastructure Innovation Pro-  
25          gram”, to provide grants for the design and installation

1 of water infrastructure projects, including wastewater  
2 transport and treatment systems and drinking water  
3 treatment and distribution systems, that use innovative  
4 materials to reduce total costs, including operation and  
5 preservation expenses, and extend the service life of in-  
6 stalled structures.

7 (b) APPLICATIONS.—To be eligible to receive a grant  
8 under this section, an applicant shall submit to the Admin-  
9 istrator an application at such time, in such manner, and  
10 containing such information as the Administrator may re-  
11 quire.

12 (c) ELIGIBLE PROJECTS.—To be eligible to receive  
13 a grant under this section, a water infrastructure project  
14 shall—

15 (1) serve a community with a population be-  
16 tween 3,301 and 99,999; and  
17 (2) use innovative materials that—  
18 (A) are resistant to degradation;  
19 (B) extend service life; or  
20 (C) provide long-term protection of water  
21 facilities and systems.

22 (d) PREFERENCE.—In providing grants under this  
23 section, the Administrator shall give preference to pro-  
24 posed projects that use materials that are domestically  
25 produced and sourced.

1       (e) SPECIAL CONSIDERATION FOR AT-RISK  
2 AREAS.—In providing grants under this section, the Ad-  
3 ministrator shall give special consideration to projects lo-  
4 cated in areas that are prone to saltwater intrusion or  
5 flooding due to severe storms, rain bursts, storm surges,  
6 or projected sea level rise during the projected lifetime of  
7 the project.

8       (f) RECORDKEEPING; REPORTS.—

9           (1) RECORDKEEPING.—Not later than 1 year  
10 after the date of enactment of this Act, the Adminis-  
11 trator shall develop a project recordkeeping system  
12 that maintains comprehensive, current, and accurate  
13 information on each grant provided under this sec-  
14 tion.

15           (2) REPORTS.—Not later than 2 years after the  
16 development of the recordkeeping system described  
17 in paragraph (1), and every 2 years thereafter, the  
18 Administrator shall submit to the appropriate com-  
19 mittees of Congress, including the Committee on  
20 Environment and Public Works of the Senate, and  
21 make publicly available a report describing, with re-  
22 spect to each project that receives a grant under this  
23 section—

24                  (A) the status of the project;

25                  (B) the location of the project;

(C) a detailed description of the scope of  
the project;

(D) the amount of project costs paid by funds provided under this section and the total project costs;

(E) the condition, operations, and performance of the project; and

(F) in every third report submitted under this paragraph, the results of the regular monitoring and evaluation of the maintenance demands, projects, needs, and costs of the project during the previous 6 years.

13       (g) AUTHORIZATION OF APPROPRIATIONS.—There is  
14 authorized to be appropriated to the Administrator to  
15 carry out this section \$65,000,000 for each of fiscal years  
16 2022 through 2026.

#### **17 SEC. 8. INNOVATIVE PROJECT DELIVERY FEDERAL SHARE.**

18       (a) IN GENERAL.—Section 120(c)(3)(B) of title 23,  
19 United States Code, is amended—

20 (1) by striking clauses (i) and (ii) and inserting  
21 the following:

“(i) prefabricated bridge elements and systems, innovative materials, and other technologies to reduce bridge construction time, extend service life, and reduce preser-

1 vation costs, as compared to conventionally  
2 designed and constructed bridges;

3 “(ii) innovative construction equip-  
4 ment, materials, techniques, or practices,  
5 including the use of in-place recycling tech-  
6 nology, digital 3-dimensional modeling  
7 technologies, and advanced digital con-  
8 struction management systems;”;

9 (2) in clause (v), by striking “or” at the end;  
10 (3) by redesignating clause (vi) as clause (vii);

11 and

12 (4) by inserting after clause (v) the following:  
13 “(vi) innovative pavement materials  
14 that demonstrate reductions in greenhouse  
15 gas emissions through sequestration or in-  
16 novative manufacturing processes; or”.

17 (b) TECHNICAL AMENDMENT.—Section 107(a)(2) of  
18 title 23, United States Code, is amended by striking “sub-  
19 section (c) of”.

